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Figure 1. Red sunflower seed weevil, *Smicronyx fulvus* LeConte.

# Sunflower

## Seed Weevils

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Two species of seed weevil attack sunflowers in South Dakota. The red sunflower seed weevil, *Smicronyx fulvus* LeConte (Figures 1 and 2) is about 1/10 to 1/8 of an inch long and rusty-red in color; the gray sunflower seed weevil, *Smicronyx sordidus* LeConte (Figure 3) is slightly larger than the red seed weevil. Larvae of both species are cream colored, legless, and C-shaped.

### Life Cycle

Biology of the two seed weevil species is similar. Larvae overwinter in the soil at a depth of about 6 inches, entering the resting or pupal stage in June. Adults begin to emerge in late June or July with peak emergence in late July to early August. Gray seed weevils typically emerge before red seed weevils. Adults initially feed on bracts of sunflower buds and later feed on pollen. Red seed weevil adults must feed on pollen before they can deposit eggs within the developing seeds. Larvae feed

within the seeds, consuming part or all of the meat (Figure 4). Fully developed larvae drop to the ground in August or September to overwinter. There is a single generation of sunflower seed weevil per year in South Dakota.

### Damage

Larvae occasionally will consume the entire seed, although, more frequently, only a portion of the seed is consumed, making it difficult to separate damaged from undamaged seed. This larval feeding reduces yield due to weight loss. Research in South Dakota has indicated that harvest loss of partially damaged seeds may be another source of yield loss.

Once eggs are deposited in the seed, larvae cannot be effectively controlled with pesticides; treatments are, therefore, initiated to prevent adults from depositing eggs into the seeds.

### Scouting Seed Weevils

Begin scouting fields for seed weevils when yellow ray petals first become visible in the field. Continue on a two to three day schedule throughout the pollination period. Examine five plants in at least five locations of the field for seed weevil activity. All sampling sites should be at least 100 feet in from the edge of a field, because weevil populations often are concentrated in field margins. Count

Figure 2. Adult red sunflower seed weevil on flower head.



Figure 3. Adult gray sunflower seed weevil, *Smicronyx sordidus* LeConte.



Figure 4. Larvae damage seeds by feeding within.



the total number of weevils on each head, and divide by the number of heads examined to arrive at an average number of seed weevils per head.

When examining sunflower heads, spray a mosquito repellent containing the active ingredient diethyl toluamide (DEET) on the surface of the head. The repellent will be very effective in bringing weevils to the surface, resulting in more accurate weevil counts. If mosquito repellent is not available, vigorously rubbing your hand over the surface of the head will help bring weevils to the surface.

Research has indicated that even if an insect repellent is sprayed on the head surface, the total number of weevils counted in the field will be lower than the actual number of weevils on that sunflower plant, referred to as the absolute number. By extensively examining many plants in commercial sunflower fields, researchers have been able to define the relationship between the number of weevils counted in the field and the absolute number of weevils on the plant. This relationship is shown in Table 1. After scouting the field and determining the average number of weevils per head, consult Table 1 to determine the absolute number of weevils per head. Economic thresholds are based on the absolute number of weevils per head.

## Economic Thresholds

In oilseed sunflowers, an economic threshold of 12 to 14 red seed weevils per head is suggested. Due to low tolerance for damage in confectionery sunflowers, one weevil per head is a suggested threshold. Economic thresholds for gray seed weevils are not well defined but are likely higher than those for red seed weevil.

## Timing Control

If an economic threshold is reached, treatment for sunflower seed weevil control should take place when 3 out of 10 heads in the field are just beginning to shed pollen, which is the R5.1 stage. The ideal plant stage to treat is when most plants in the field are at 40% pollen shed, the R5.4 stage. However, it is recommended that control be considered at the earlier R5.1 stage.

Consideration of treatment at the early pollen-shed stage is due to the fact that weather conditions or busy schedules may prevent a field from being treated immediately when an economic threshold is reached. This consideration should allow growers a sufficient time cushion to have fields treated before the ideal plant stage for treatment passes. Conversely, if a field is treated too early -- for instance, at bud stage -- more weevils may continue to emerge from the soil, making a second application necessary.

Treatment timing is slightly different for confection sunflowers. If economic infestations exist, initial treatment should take place when 10 to 15 percent of the heads in a field are at the early pollen shed stage.

Consult South Dakota State University Extension Fact Sheet 888-OS, "Insect Control for Oilseed Crops," for specific insecticide recommendations for seed weevil control. If an insecticide application is necessary, make applications in early morning or evening hours to minimize risk to honey bees. If blooming sunflowers must be treated, notify local beekeepers to allow for movement or confinement of hives during the application.

**Table 1. Estimation of absolute red sunflower seed weevil adults when sampling, using a commercial formulation of mosquito repellent.**

Number counted in the field	Absolute number	Number counted in the field	Absolute number
1	1.4	11	19.5
2	2.9	12	21.3
3	4.4	13	23.1
4	5.8	14	24.9
5	7.3	15	26.9
6	10.7	16	29.3
7	12.4	17	31.1
8	14.2	18	32.9
9	16.0	19	34.7
10	17.8	20	36.6

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